

Integrated Pest Management Programs Strive To Solve Agricultural Problems

The Agricultural Research Service currently conducts integrated pest management (IPM) programs and research at 44 locations. More than 135 projects are focused on developing and testing environmentally friendly pest control technologies as a part of an IPM strategy. These projects emphasize biological control, behavior-modifying chemicals, sterile-insect release techniques, resistance management, cultural practices, improved pesticide application technologies, and other related pest control tactics. Target pests include a multitude of insects, mites and ticks, plant pathogens and nematodes, and weeds.

A prominent focal point of the agency's program has been its nine areawide IPM projects, which have been developed in partnership with other federal and state institutions and the private sector. These multistate 5-year projects are managed out of Wapato, Washington (codling moth), Brookings, South Dakota (corn rootworm), Manhattan, Kansas (stored-wheat insects), Sidney, Montana (leafy spurge), Gainesville, Florida (fire ants), Hilo, Hawaii (fruit flies), Stillwater, Oklahoma (Russian wheat aphid and greenbug), Stoneville, Mississippi (tarnished plant bug), and Fort Lauderdale, Florida (melaleuca).

The concept behind areawide pest management is that existing technologies are most effective when used over a multistate or multiregional area. Crucial to success is to have all or most of the farmers in a large area simultaneously implement the program so that pests have no safe haven or alternative food source. Adoption of the technologies by growers and pest control practitioners is a goal of demonstration projects.

The late Edward F. Knipling, an ARS pioneer in insect control, was a strong proponent of the areawide IPM concept. One of his major achievements was development of the sterile-male release technique, which eliminated screwworm and other insect infestations in many parts of the world. In the early 1980s, Knipling developed the concept of using specific insect parasites, predators, and other tactics over broad areas to keep pest populations below the point at which they impose a financial burden on farmers and ranchers. When kept at low levels, pests are more responsive to biological rather than chemical controls.

Today, the areawide concept has grown to include not only parasites and predators, but also other environmentally friendly tactics, such as mating disruption and insect attracticides—an attractant combined with a pesticide.

A successful areawide IPM program requires close partnerships among representatives from ARS, other federal agencies, state agricultural experiment stations, and the private

sector. Areawide pest management teams discuss the best approach for implementing a particular program once key pests have been selected by a peer review process.

For example, in the TAME Melaleuca areawide project (story on page 4), ARS investigators are working hand-in-hand with the South Florida Water Management District and the University of Florida's Institute of Food and Agricultural Sciences to integrate mechanical, herbicidal, and biological controls for the invasive melaleuca tree, *Melaleuca quinquenervia*.

ARS launched the first areawide IPM attacks against the codling moth, a pest in apple and pear orchards, on 7,700 acres in the Pacific Northwest. Other programs include a major assault against the corn rootworm on over 40,000 acres in the Corn Belt, fruit flies in the Hawaiian Islands, and leafy spurge in the Northern Plains area. In 2001, an areawide IPM project began for fire ants in Florida, Mississippi, Oklahoma, South Carolina, and Texas on pastures using natural enemies, microbial pesticides, and attracticides.

In 2002, ARS scientists in Stillwater began an areawide IPM project on Russian wheat aphid and greenbug on wheat in the U.S. Great Plains using customized cultural practices, pest-resistant cultivars, biological control agents, and other biologically based pest control technologies. Also in 2002, an areawide IPM project began for tarnished plant bug on cotton in the delta of Mississippi and Louisiana using host destruction, host-plant resistance, and remote-sensing technology. This project is an expansion of an ongoing in-house program developed by ARS scientists in Stoneville, Mississippi.

Awards have shown the success of these projects. For example, in May 2004, the U.S. Pacific Basin Agricultural Research Center in Hilo won a Federal Laboratory Consortium Award for Excellence in Technology Transfer for work with the fruit fly IPM. In 1999, the Yakima (Washington) Agricultural Research Laboratory won this same award for work with codling moth.

Four programs have won the top technology transfer award from ARS: in 1998, the codling moth project; in 1999, the corn rootworm project; in 2003, TEAM Leafy Spurge; and in 2004, the Hilo fruit fly project. Three projects have won USDA's Group Honor Award—fruit flies, codling moths, and leafy spurge.

One goal of ARS is to help bring more and more of the nation's farmland under biointensive integrated pest management. While it will be a difficult task to accomplish, by implementing areawide projects that strike these and other pests, the goal should become even more within our grasp.

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